UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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SEP 3 0 2008

**MEMORANDUM**

REPLY TO THE ATTENTION OF

**SUBJECT:** Response to National Remedy Review Board Recommendations for the Waukegan Harbor Operable Unit of the Outboard Marine Corp. Superfund Site

**FROM:** Richard C. Karl, Director
Superfund Division

**TO:** Amy Legare, Acting Chair
National Remedy Review Board

**Purpose**

The National Remedy Review Board (the Board) conducted its review of the proposed cleanup action for the Waukegan Harbor Operable Unit (OU) of the Outboard Marine Corp. (OMC) Superfund Site (Waukegan, Illinois) on June 18, 2008. This memorandum provides the Region's responses to the Board's advisory recommendations dated September 24, 2008.

**Comment 1**: "In the presentation to the Board, the Region provided very limited information on the relationship between PCB concentrations in the harbor sediments and the concentration of PCBs found in harbor fish at this specific site. A good understanding of the relationship between sediment concentrations and fish tissue concentrations is critical to understanding the anticipated effectiveness of the remedy. The package states:

> To achieve a significant reduction in PCB bioavailability in the sediment, a target removal level of 1 ppm PCBs was set, based on cleanup goals established for other PCB sediment cleanup sites in the Region. At the other sites, removal and/or covering of sediment at 1 ppm or greater PCBs was determined to allow for the achievement of a SWAC of about 0.25 ppm PCBs for sediment.

The Board recommends that the Region revise the decision documents to include a more detailed discussion of the relationship between PCB concentrations in the harbor sediments and in the harbor fish. This discussion should include an analysis of the factors the Region used to determine the applicability of the 1 ppm PCB cleanup goal to this site. The Region should consider whether existing fish tissue data provide further insight into the relationship between current harbor sediment PCB concentrations and the current fish tissue PCB concentrations. Typically, one expects a first order decay curve in the relationship between contaminant concentrations in sediment and fish, suggesting that as contaminant concentrations approach background, the same degree of contaminant concentration reduction in sediment will have a smaller reduction in fish tissue than at higher sediment concentrations. The Region should

consider calculating the amount of PCB mass removal per volume of material dredged as a way to maximize the efficiency of the remedial action."

**Response 1**: The Region conducted a risk evaluation to develop the cleanup level for PCBs in the harbor sediment (*Risk Evaluation for Development of a PCB Sediment Cleanup Level Waukegan Harbor Area of Concern*, EPA, July 2006). Analytical results from sediment samples were used to establish an empirical relationship between the concentrations of PCBs in sediment and fish tissue and to calculate cleanup levels corresponding to various fish consumption rates. The evaluation first calculated a risk-based concentration ($RBC_{fish}$) of PCBs for fish tissue – corresponding fish tissue PCB levels to target risk levels for individuals that consume the fish. High-end consumers (subsistence fishermen) were assumed to have a fish diet of 25 percent bottomfish and 75 percent gamefish, whereas a recreational angler was assumed to have a fish diet of 100 percent gamefish. Both cancer and non-cancer endpoints were calculated. Next, an estimation of a biota sediment accumulation factor (BSAF) was calculated. The BSAF is the ratio of contaminant concentration in tissue to the concentration in sediment. A proportional relationship (or first-order) between the concentrations in tissue and sediment is assumed in the calculations. Lastly, a sediment RBC is calculated for each type of consumer using the $RBC_{fish}$ and the BSAF. Uncertainty factors were also discussed in the report. These included assumptions that the fish get their entire PCB burden from the harbor, that the recreational anglers and high-end consumers eat a certain number of fish meals per week, and certain other technical factors listed therein. The Region agrees that the results of the evaluation should be thoroughly presented in the Record of Decision Amendment in support of the remedy selected.

The Region had generated a tabulation of the estimated volume of harbor sediment impacted by PCB concentration levels (e.g. 9,380 cubic yards at 10 ppm and above, 220,000 cubic yards at 1 ppm and above) so that PCB mass removal can easily be calculated from these volume and concentration estimates.

| PCB Contaminated Sediment Removal Volume Estimates Waukegan Harbor (All Sections) | |
|---|---|
| PCB Concentration (ppm) ¤ | Sediment Volume (yd3) |
| <1 | 526,237 |
| ≥ 1 | 219,958 |
| 1-10 | 210,578 |
| > 10 | 9,380 |
| Total = | 746,195 |

¤ Overall Average = 2-3 ppm

A similar table was generated for each segment of the harbor for use in designing a selected cleanup action.

**Comment 2**: "Based on the material presented to the Board, remedial action objectives (RAOs) at the site are unclear. The Board could not tell whether the RAO was to meet a specific fish

tissue concentration, a cancer risk target in humans, a surface weighted average contaminant concentration in sediments, or to remove all contaminants above 1 ppm. The Board recommends that the decision documents clarify which of these potential objectives are actually RAOs that will be the basis for evaluating the remedy's success. In addition, the Region may want to consider whether a more appropriate RAO would be to reduce fish tissue concentrations to area background concentrations for comparable fish tissue. This concentration may not be equal to goals for risk-based fish tissue concentration."

**Response 2:** The RAO is to protect human health and the environment from the adverse effects of PCBs attributable to the site. To do so, the Region proposes to clean up PCB-impacted harbor sediment to achieve a 0.2 ppm surface-weighted average concentration (SWAC). To achieve this SWAC goal, the Region proposes to dredge sediment to an action level of 1 ppm PCB at any single location and to lay down a thin, clean sand mixing layer post-dredging to allow for dilution of residual PCBs in any sediment that re-settles to the harbor bottom after being suspended into the water column during the dredging action. Based on the risk assessment, achieving the sediment cleanup level will result in the decrease of fish tissue PCB levels in fish with limited home ranges within the harbor.

The Region also notes that it is an ancillary goal to have the harbor delisted as an International Joint Commission Great Lakes Area of Concern (AOC). To be delisted as an AOC, we must address six beneficial use impairments (BUI) that include restrictions on fish consumption and dredging activities, among others. We are confident that the proposed harbor cleanup remedy will also achieve the delisting goal.

**Comment 3**: "Similarly, from the materials presented to the Board, it was unclear whether the Region was basing acceptability of fish tissue concentrations for human consumption on State fish consumption advisory tissue concentrations or the fish tissue concentrations developed in the EPA risk assessment. The Board recommends that the Region clearly state which one is being used in the remedy objectives."

**Response 3:** The Region has calculated a target sediment PCB concentration (0.25 ppm SWAC) based on fish tissue concentrations developed in the risk assessment. The Illinois Environmental Protection Agency (IL EPA) has advised the Region that a SWAC of 0.20 ppm PCB would allow for unlimited consumption of fish from the harbor based on its methods for calculating risk and placing consumption advisories. The presentation was meant to convey that our state partner was in general agreement with our approach for harbor cleanup in terms of the target SWAC value.

**Comment 4**: "If an RAO for this remedy is reduction of PCB concentrations in fish tissue, the Board recommends that the Region refine this RAO so that the objective is likely to be measurable and achievable. Factors that the Region may want to consider in refining this RAO include fish species, size, sex, time of collection, as well as the sampling location. These parameters can be critical in decreasing data variability and in demonstrating remedial success. The Board is concerned that without greater specificity, improvements in environmental conditions resulting from the remedial action will be difficult to document. The Board recommends that decision documents or other technical documents developed post-ROD as part

of the remedial design monitoring and maintenance program provide greater specificity in describing how contamination levels will be measured. The Region should consult the draft guidance for monitoring fish to evaluate remedy effectiveness for more information. (see Sediment Assessment and Monitoring Sheet #1: *Using Fish Tissue Data to Monitor Remedy Effectiveness*, OSWER Directive 9200.1-77D, October 2007). In addition, the decision documents should include estimated timeframes for meeting the RAO and when the fish advisories can be eliminated."

**Response 4:** The Region agrees that the RAO needs to be measurable to ensure that the remedy's success can be documented. As such, the Region proposes to clean up PCB-impacted harbor sediment to achieve a 0.2 ppm SWAC. To achieve this SWAC goal, the Region proposes to dredge sediment to an action level of 1 ppm PCB at any single location and to lay down a thin, clean sand mixing layer post-dredging to allow for dilution of residual PCBs in any sediment that re-settles to the harbor bottom after being suspended into the water column during the dredging action. Post-construction sampling will be able to clearly document achievement of this action level. The Region will also conduct a post-construction multi-year fish study and/or a caged fish study, or other method as outlined in OSWER Directive 9200.1-77D, to document decreasing PCB levels in fish tissue.

An ancillary goal is to have the harbor delisted as an International Joint Commission Great Lakes Area of Concern (AOC). To be delisted as an AOC, we must address six beneficial use impairments (BUI) that include restrictions on fish consumption and dredging activities, among others. Others are assisting our Great Lakes National Program Office (GLNPO) in determining the BUIs for the site as well as measurable endpoints to denote success in addressing the BUIs. The Region is confident that a Superfund cleanup action in the harbor will have the added benefit of addressing most or all of the BUIs identified for this AOC.

It is the Region's expectation that the Illinois Department of Natural Resources (IDNR) and IL EPA will continue to annually sample the harbor fish and analyze them for PCBs, respectively, and provide the information to the Region for evaluation. In addition to the specific post-construction monitoring program established for the harbor, the Region will continue to work with IDNR and IL EPA on fish sampling efforts. We will consult the referred guidance document as suggested to help craft a monitoring program post-dredging to measure effectiveness.

The estimated time to achieve acceptable risk-based PCB levels in harbor-caught fish depends on numerous factors including those listed in comment 4, above. Assuming that all harbor-caught fish derive their PCB burdens solely from the harbor, the Region generally expects to see a reduction in fish PCB burdens within a 5-year period. The Region agrees that the decision documents should include a discussion of the above.

**Comment 5**: "It was not clear to the Board what role the Region intends for the beneficial use impairment corrections. The Board recommends that the Region clarify that the objective of the remedial action is to protect human health and the environment; as such, any reduction of beneficial use impairments should be an ancillary benefit rather than an additional goal of the action."

**Response 5:** As presented in Responses 2 and 4, above, the Region agrees that the objective of the Superfund remedial action is to protect human health and the environment and that reduction of beneficial use impairments is an ancillary benefit.

**Comment 6**: "The package presented to the Board did not include an alternative to remove only the hot spot areas (e.g., >10 ppm PCBs in sediments). Hot spot removal might decrease the amount of sediment that would need to be disposed of onsite, decrease the size of the disposal cell, decrease the amount of water that would require treatment, and decrease the amount of ammonia to be disposed. Given that average PCB concentrations are already approximately 2 ppm and the SWAC goal is 0.25 ppm, a better understanding of the relationship between contaminant concentrations in sediment and fish tissue (discussed in comment 1), should improve the Region's ability to evaluate whether hot spot removal can effectively reduce fish tissue concentrations while producing less ammonia and requiring less disposal. The Board recommends that the Region evaluate an alternative that considers hot spot removal of contaminated sediment. The Region should also consider whether monitored natural recovery could be effective in reducing the final increment of elevated PCB concentrations to reach the SWAC of 0.25 ppm."

**Response 6:** The Region has evaluated the removal of hot spot areas (>10 ppm PCBs in sediments) in the harbor. Based on our analysis, the removal of an estimated 9,380 cubic yards of harbor sediment containing 10 ppm PCBs or above would leave a residual mass of sediment (an estimated 210,000 cubic yards) that averaged about 1.45 ppm PCBs with a SWAC (top 6 inches) of about 0.86 ppm - above the target cleanup goal. This is likely still a level of PCBs at which the U.S. Army Corps of Engineers (USACE) would be reluctant to dredge for fear of Superfund liability being imposed on it.

Given the low estimated shoaling rates for the harbor (because it is a closed system, generally only small amounts of blowing sand is deposited into the entrance channel of the harbor), monitored natural recovery would not achieve the target SWAC of 0.2 ppm under the current average 2.40 ppm PCB level for up to 100 years. Reduction to an average 1.45 ppm PCB level would still delay meeting the RAO of a 0.2 ppm PCB SWAC for at least several decades.

The Region acknowledges that removal of only the 9,380 cubic yards of >10 ppm PCB material would greatly reduce the potential cleanup costs, however, to less than $5 million from an estimated $35 million for the proposed project. This quantity of sediment could be more easily dewatered and trucked off-site for disposal. Moreover, a mechanical dredge would be likely be used, which reduces the amount of dredge water to be disposed of. However, due to the low shoaling rates, a residual sand cover would still be necessary, likely resulting in the need to remove additional material to accommodate a 6-inch sand layer and maintain current depths for current uses of the harbor.

**Comment 7**: "The Board notes that the US Army Corps of Engineers (USACE) has not dredged the harbor in many years, and the cost of dredging uncontaminated sediments is significant. To the extent that the USACE would have had to spend this money even if the harbor was not contaminated, the Board recommends that the Region investigate the opportunity

for a mutually beneficial partnership with USACE (i.e., whereby EPA pays the incremental cost caused by the presence of contaminated sediments above the cost of ordinary navigational dredging.) Such a partnership could potentially include industries that rely on shipping or the City of Waukegan, as appropriate."

**Response 7:** The Region agrees with the Board's recommendation and notes that it has been working for some time now with the USACE and area industries and state and local governmental bodies to put together a mutually beneficial partnership to effect a harbor cleanup action. We shall continue to explore all partnership opportunities as we work towards achieving our RAO. However, it should be noted that over the last 30+ years, the USACE has made the determination not to dredge the portions of the harbor that would require confined disposal of any kind. The only navigation dredging performed at Waukegan Harbor removes uncontaminated sediments that are suitable for disposal into the open lake, or that can be utilized for beach nourishment.

**Comment 8**: "In the presentation to the Board, the status of the baseline risk assessments for both human health and ecological risk was not clear. The Board recommends that the Region ensure that both baseline risk assessments have been completed in order to select a remedy consistent with CERCLA, the NCP, and Agency guidance. The decision documents should make use of both assessments to provide the rationale and basis for the proposed action. The package presented to the Board indicates that the risk to recreational fishers is approximately half of the risk to subsistence fishers. However, the exposure assumptions presented would suggest this difference should be a factor of four. The Region should confirm the validity of its risk calculations and explain the basis of the risks in greater detail in the decision documents to clarify this apparent discrepancy. In addition, in discussing ecological risks, the package presented to the Board indicated the harbor was of "little value as habitat." However, the human health risk assessment assumes that subsistence fishers are eating 225 meals per year of harbor caught fish. These two statements seem inconsistent and the Region should clarify this issue in the decision documents."

**Response 8:** The Region agrees that the CERCLA requirements for conducting a baseline risk assessment are to be met and that the risk assessment will be used to justify the proposed action.

The Region re-evaluated its risk calculations (*Clark, 2008*) to dispel the "discrepancy" noted above. The original risk numbers provided to the Board were based on 2003 and earlier work and have been updated. Later work in 2006 provided a review of site risks and recommended sediment cleanup levels as described in Response to Comment 1, above.

Focusing on high-end consumers ("subsistence fishermen"), the following assumptions were made:

(1) Reasonable Maximum Exposure (RME) is a high-end consumer eating 95 half-pound meals per year (59g/day) with 50% of the meals from the harbor
(2) 50% reduction in PCBs from cleaning and cooking
(3) 75% sport fish and 25% bottom feeders consumed
(4) Data set from 2001-2005 giving 1.08 ppm PCB weighted average in fish consumed, and
(5) Exposure only considered for adults, not children or infants

Excess Lifetime Cancer Risk (ELCR) is 2.0E-4 while non-cancer risks have a Hazard Index (HI) quotient of 11.4. Such risks to adults are more than an order of magnitude greater than acceptable levels and indicate potential immune, reproductive, and cognitive risks. *If risks were calculated for infant and children RME, based upon methodology used for the Fox River RI/FS, the HI would be 2.5 times higher or 28.5 for Waukegan Harbor.*

For adult recreational anglers, similar consumption assumptions are made except that 100% sport fish consumption is assumed. This brings the PCB weighted average value to 0.30 ppm, resulting in an ECLR of 5.5E-5 (acceptable risk) and a HI of about 3.2 (adverse risk). If risks were calculated for infant and children RME, based upon methodology used for the Fox River RI/FS, the HI would be 2.5 times higher or 8.0 (adverse risk).

In terms of ecological risks, the nature of a working harbor in addition to the PCB-impacted sediment would preclude having "high-value" habitat therein. This does not mean, however, that the harbor contains little fish to be caught and eaten. The Region will clarify this in the decision document as recommended.

**Comment 9**: "The material presented to the Board appears to indicate that the goal of the remedy may be "...to reduce harbor-caught fish consumption health risks to within the Superfund risk range of $1x10^{-4}$ to $1x10^{-6}$ excess cancer risk and to achieve a Hazard Quotient of 1 or less." However, the human health risks presented to the Board for subsistence fishers were only greater than the upper end of the risk range target by a factor of five. It was not clear to the Board from the material presented whether the Region is fully taking into account the possible risk reduction that could be achieved with more robust outreach (e.g., more education, more surveys to understand consumption patterns). The Board recommends that the Region consider whether fishing bans or other institutional controls could be used to further reduce risks at the site. The Region should explain in its decision documents how ongoing outreach activities support implementation of institutional controls."

**Response 9:** The Region believes that fishing bans and institutional controls alone would not be an effective tool at the harbor. According to a 2006 survey by the Waukegan Community Advisory Group (CAG), fishermen are already aware of and ignoring the current harbor fish-consumption advisories as they had admitted to eating their catch despite the advisories.

In addition, as above, the calculated Hazard Index (HI) quotients ranged from 11 to 28 for the target consumers. Thus, unacceptable risks are about 11 to 28 times higher than the risk range target.

**Comment 10**: "Based on the information presented to the Board, it was unclear how the federal authorization of the channel is being considered by the Region in selecting a remedy that addresses contaminated sediments and makes the channel available for USACE to maintain at the specified depth. The Board recommends that the Region further evaluate all of the potential legal requirements (including, for example the Clean Water Act) in selecting a remedy for the site. The Board also recommends that the Region clarify the role, if any, of beneficial use impairments."

**Response 10:** The Region agrees that that, strictly speaking, the USACE's navigational interests in a particular harbor and its dredged depth is not an applicable regulation, as under CERCLA 121(d)(2(A) ARARs are limited to federal environmental regulations (and state environmental or facility siting requirements). We do, however, attempt to harmonize our remediation activity with existing law when relevant or appropriate to do so. For example, the Occupational Safety and Health Act (OSHA) of 1970 is a non-environmental statute we generally require our remedial actions to comply with (and has been called an ARAR in the past). And, we often consider it necessary to have transporters of cleanup site wastes to disposal facilities meet U.S. and/or state Department of Transportation (DOT) or even local government weight-load requirements for roadways.

The Region always considers current and future land use when we select a cleanup remedy (i.e. commercial-industrial, mixed-use, residential, etc.). There are two rationales we have for respecting the USACE designation of Waukegan Harbor as a navigation channel of 18 feet. The first is more compelling: it was an act of Congress that designated Waukegan Harbor as a federal navigation channel with an authorized depth of 18 feet. Therefore, only an act of Congress should change that designation and depth and not a remedy decision made by an executive agency. The second reason is that the harbor's current and future use is as a commercial-industrial-use harbor. In most locations in Waukegan Harbor, the channel depth is already 18 feet. Capping a portion (or all) of the already existing 18-foot navigation channel would likely change the current and future use of the harbor by reducing the likelihood that supply boats would be able to access the industries.

Lastly, there is the legal question of "who owns the harbor/navigation channel" that is the targeted subject of the proposed cleanup action. The City of Waukegan has said that it does, but the Region is not certain that is actually the case. Counsel has not completed researching the issue, and it is ultimately possible that the adjacent shoreline owners do own the harbor to the middle of the channel, even though the USACE states that it owns the sediment if it is located in "its" navigation channel. Thus, if the Region were to select a capping remedy for the entire harbor, the industries that use the harbor to bring in their raw materials could have a legitimate "takings" claim against the United States.

Beneficial Use Impairments

In 1991, the International Joint Commission approved guidelines for listing and delisting Areas of Concern (AOCs) in the Great Lakes Basin Ecosystem by restoring beneficial uses. Waukegan Harbor is a listed AOC. The Great Lakes Water Quality Agreement calls for Remedial Action Plans (RAPs) to be developed to restore and protect 14 beneficial uses in AOCs. An impaired beneficial use means a change in the chemical, physical or biological integrity of the Great Lakes system sufficient to cause any of the following:

-restrictions on fish and wildlife consumption
-tainting of fish and wildlife flavor
-degradation of fish and wildlife populations
-fish tumors or other deformities

-bird or animal deformities or reproduction problems
-degradation of benthos
-restrictions on dredging activities
-eutrophication or undesirable algae
-restrictions on drinking water consumption, or taste and odor problems
-beach closings
-degradation of aesthetics
-added costs to agriculture or industry
-degradation of phytoplankton and zooplankton populations
-loss of fish and wildlife habitat

The presence of low-level PCBs in Waukegan Harbor sediment and other factors have lead to the identification of six BUIs for the system; these include beach closings, loss of fish and wildlife habitat, restrictions on dredging activities, degradation of benthos, restrictions on fish and wildlife consumption, and degradation of phytoplankton and zooplankton populations. PCB sediment contamination has been linked directly or indirectly to all of these BUIs except beach closings.

The Great Lakes Legacy Act (GLLA) of 2002 authorized federal funding to clean up contaminated sediments in Great Lakes AOCs designated under the Great Lakes Water Quality Agreement. The GLLA authorized $270 million over five years to remediate contaminated sediments and requires a minimum of 35% nonfederal cost share for remediation projects. The Region expects to address the harbor under either Superfund or the GLLA (but not both).

Portions of the Clean Water Act may impact how or whether a sand layer is placed in the harbor, for example, but is not the driving force behind the cleanup of the harbor.

**Comment 11**: "The Board notes that the re-suspension of fine sediment during dredging, and potentially following the placement of cover material, may impact the attainment of the RAOs. The Board recommends that the Region evaluate the impact of re-suspension and sedimentation of fine-grained particles on the implementation and effectiveness when considering remedial action alternatives."

**Response 11:** The Region will evaluate the impact of re-suspension and sedimentation of fine-grained particles on the implementation and effectiveness when designing the harbor cleanup remedy. The residual sand layer was selected to help reach the target SWAC due to expected re-suspension of fine-grained materials.

**Comment 12**: "The estimated total present worth value cost for Alternative #2 (the Region's preferred remedy), as presented in the package, is approximately $1.9 million more than Alternative #3. The cost difference is primarily associated with dredging everywhere in the harbor (Alternative #2) versus the federal channel only and capping elsewhere (i.e., the North Harbor; Alternative #3). Additionally, a Value Engineering (VE) study done as part of the Great Lakes Legacy Act pre-design work in 2006, recommended an in-situ cap in the Northern Harbor. Given this VE study, the Board recommends that the Region provide further justification in the

decision documents for the Region's preference of Alternative #2, with its greater additional costs, rather than Alternative #3."

**Response 12:** The Region shall provide the appropriate justification for the harbor alternative selection in the decision document as recommended by the Board. Essentially, given that the cost estimate at the Feasibility Study stage has a range of +30/-50 percent, the Region believes that the two alternatives are equal in terms of cost. The complete dredging alternative (#2) however, permanently removes the impacted sediment from the harbor, which is preferable to capping the impacted material in place. Moreover, the Region did not accept the VE study recommendation cited above for similar reasons.

**Comment 13**: "In the detailed cost information provided to the Board for the preferred Alternative #2, approximately $2.7 million is shown for the in situ cap/cover placement. Approximately $1.4 million of this total capital cost is for the residual sand cover layer over the bottom of the federal channel to achieve the SWAC goal. The Board recommends that the Region provide further justification for the sand cover given that it appears the USACE will need to go back and dredge the harbor for navigational purposes. Additionally, the Board recommends that confirmation sampling be performed before determining the need for and extent of the sand cover. Further, the Board recommends that the Region consider making sampling a contingency in the decision documents with specific criteria included to define where, if at all, a sand cover would be placed. The Board notes that the use of cover material is one of the remedial options identified by the Region to meet the final sediment PCB concentration goal after dredging. The Region should consider whether monitored natural recovery may be appropriate in this situation to achieve the RAO instead of a thin-layer cap with dredging."

**Response 13:** The residual sand layer is needed to dilute remaining sediment material that will re-settle to the bottom after dredging is completed in order to achieve the target SWAC. This will have the added benefit of allowing the USACE to further dredge the harbor as needed to maintain the depth because the low residual PCB levels would likely not trigger its fear of potential Superfund liability. The sand cover is estimated to be a mere 6-10 inches thick and will not significantly detract from the harbor depth readings because an over-dredge of 1 foot will be designed into the project. Also, the sand layer will immediately help to achieve the target SWAC whereas monitored natural recovery will take a longer time to achieve. Lastly, because PCBs are not prone to breakdown and only very limited natural shoaling occurs in the harbor, it is very unlikely that monitored natural recovery would be effective at reducing even low-levels of residual contamination.

The Region agrees that confirmation sampling should be performed before determining the need for and extent of the sand cover. However, based on experience at the Lower Fox River site, the sand cover will be necessary and it is prudent to place the estimated costs into the overall project cost estimate.

The Region appreciates the Board's efforts in reviewing the proposed cleanup remedy for this site. As requested, a draft response to the Board's findings will be included with the draft Proposed Plan when we forward it to our OSRTI Regional Support Branch for review.